ABSTRACT OF THE DISCLOSURE

Anterior ischemic optic neuropathy (AION) is one of a family of ischemic diseases affecting the optic nerve. A blockage of vessels supplying the intra-retinal portion of the optic nerve results in loss of axon transport stasis, retinal ganglion cell (RGC)--specific dysfunction, and RGC death. AION research has been limited by the lack of a low-cost model for this disease. The invention of such a model has now been developed. Using a custom contact lens, an intravenous injection of photosensitizing agent is administered to anesthetize male Sprague-Dawley rats. A laser was used to activate dye within the small vessels perfusing the optic nerve. This treatment was adjusted to spare the larger caliber vessels perfusing the inner retina. Electrophysiologically, a decrease in amplitude of the visual evoked potential is noted. Histologically, alterations in axonal transport are seen. Polymerase chain reactions (rt-PCR) indicate that there are both early RGC-specific, and later retinal gene expression changes in the treated animals. This method replicates many cellular and molecular level changes in a low-cost animal model.